

1. The notice of abandonment dated 17 February 1994 was mailed in error. This application is not, and was not, abandoned. The response filed 27 January 1994, filed with an appropriate extension of time and a certificate on mailing, was timely filed.

2. Claim 26 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 26 it is not clear what, if any, claimed structure allows surface phenomena of the material to be excluded, there are apparently unclaimed means for doing this; the claims thus is incomplete. It is also not clear, due to the use of the word "may", if such exclusion of surface phenomena is, and is intended to be, actually claimed or not.

3. Claims 43-52 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 43 discusses two different distances from the sample, but does not define any means or the like to actually place the instrument at different distances from the sample, and it is not clear whether the claim is, or is intended to be, so limited.

The claim is thus unclear in that the scope of the claim cannot be accurately determined. None of the dependent claims set forth such means, and thus inherit this rejection.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

6. Claims 1, 2, 7, 8, 39 and 40 are rejected under 35 U.S.C. § 102(b) as being anticipated by Borsboom (US 4,884,891).

Borsboom shows a probe which illuminates a sample; the sample can be translucent (see column 5, line 9) so the detected light will pass into and through the sample. Light is detected from two paths through the sample (path 3-4 and path 3-7). The illuminating area (3) and the two receiver areas are distinct; at no point does light pass into or out of any two of these paths. At least one of the transmission paths (3-7) is defined by an area (7) which extends transverse to the direction of illumination passage and is substantially constantly spaced from the surface area of the illumination (3). There are means to detect as plurality of signals (the detectors shown in figure 5, for example) representing the optical information from the sample from along the two paths. The signals are processed (in section 20), such processing is appropriate. The probe 1 has a tip with a central aperture, and fiber optic elements (4,7) receive energy transmitted through the specimen to the central aperture.

7. Claims 1, 2, 6-8, 33 and 36-39 are rejected under 35 U.S.C. § 103 as being unpatentable over Howarth (US 3,994,602).

Howarth shows, in figure 7, providing illumination by way of a plurality (two) different substantially parallel paths through an interior portion of a specimen (16) having a characteristic to be measured; the two paths are 1) from the source to window 61, and 2) from the source to window 62. Each of the paths are defined by two distinct surface areas, the source window and

window 61 for the first path, and the source window and window 62 for the second. One window (62) is closer to the source than the other (61), this closer window is contained within the boundary defined by the windows of the other path. Howarth senses a plurality of independent signals (the signal from D1 and the signal from D2) developed at the same time representing optical information obtained from the specimen, with each signal corresponding to a particular path. The signals are processed by a "modeling technique" which is appropriate for the desired measurement to minimize inaccuracies in the measured characteristic of the sample.

Howarth does not discuss the shape of the windows 61, 62. It would have been obvious to make these windows extended in length at substantially constant distance from the light source window because making the windows large would allow the collection of more light that has passed through the sample, and, as the test operates by measuring light that has passed a particular distance through the sample (note figure 6) making the window encompass a wider range of distances from the light source window would decrease the accuracy of the measurements.

In figure 4, Howarth shows an angle between the illumination axis (through window 17) and the detector axis (through window 18). It would have been obvious to maintain this disclosed relationship in the embodiment of figure 7 of Howarth because it is a variant of the same invention that works by the same

principles and thus this arrangement would be expected to be as advantageous in that embodiment as in the embodiment of figure 4.

8. Claims 3, 5, 9, 10 and 41 are rejected under 35 U.S.C. § 103 as being unpatentable over Howarth (US 3,994,602) or Borsboom (US 4,884,891) in view of Venable (US 4,711,580) and Lebling et al. (US 4,583,858).

Both Howarth and Borsboom show the basic claimed arrangement, but neither shows directing the light long the different paths sequentially each with a different modulating characteristic. It is known in general in the art that light paths can be reversed and a light source and a plurality of detectors can be replaced by an equivalent arrangement of a detector and a plurality of light sources. This can be seen by a comparison of Venable, which shows a light source (102) and a plurality of detectors (fibers 103) at different angles and Lebling et al, which shows a plurality of light sources (fibers 10, 11,12) and a single detector (fiber 24), Because this is in general a well-known construction alternative, it would have been obvious to construct the arrangements of Howarth and Borsboom by replacing the light source with a detector and the detectors with light sources, driving the light sources on and of sequentially, with a different modulation characteristic (phase) as does Lebling.

9. Claim 4 is rejected under 35 U.S.C. § 103 as being unpatentable over Howarth or Borsboom in view of Venable and Lebling et al. as applied to claim 2 above, and further in view of Badessa. It is known to separately detect light from a plurality of measurement paths with a single detector by modulating the light in the different measurement paths at different frequencies and using appropriate filters or the like to separate the signals from the detector; Badessa shows this. It would have been obvious at the time the invention was made to use this known technique to separate the two signals from the two measuring paths in the obvious arrangement of instant claim 2.

10. Claim 34 and 42 are rejected under 35 U.S.C. § 103 as being unpatentable over Howarth or Borsboom as applied to claims 1 and 39 above, and further in view of Hirao et al (US 5,057,695).

Hirao et al shows that those in the art known that in such arrangements in which there are a plurality of light paths of different lengths through a sample, the illumination and detection areas may be either on the same side (figures 2 and 4) or opposite sides (figure 5). It would have been obvious to place the illumination and detection areas of Howarth or Borsboom on different sides of the sample because, as shown by Hirao et al, it is a known equivalent to placing them both on the same side.

11. Claim 26 is rejected under 35 U.S.C. § 103 as being unpatentable over Venable (US 4,711,580) and Gerber (US 5,003,500) in view of Lebling et al. (US 4,583,858).

Venable shows the basic claimed arrangement with a central light source illuminating a sample and a plurality of fiber optic means receiving light from the sample at different angles and directing the light to detectors. The light received from the sample inherently relates to the particular material of the sample; it is clear that such signals cannot relate to anything else, such as the material of some other sample. Venable does not show the use of rings of detectors at the different angles although there are a plurality of detectors at each angle. It would have been obvious to use a ring, as shown by Gerber to detect the light because this would increase the light detected at each angle and thus generate a stronger signal. Venable also does not show the details of the construction of the device; making the arrangement in the general shape of an elongated probe with a tubular element holding the elements, as in Lebling et al., would have been obvious because this is a known construction for such instruments.

12. Claim 43 and 52 is rejected under 35 U.S.C. § 102(b) as being anticipated by Witte (US 4,054,391).

Witte shows an optical means which defines an illumination area and a detection area. When the apparatus is placed at some

first distance from the surface, the illumination and detection areas will be distinct; such a distance is determined by the construction of the instrument and is thus determined prior to any test by the instrument. When placed at a second distance, the illumination and detection areas are at least partially superimposed. The instrument of Witte uses some modeling technique which is appropriate for the test and the sample being examined. At a plurality of different distances the instrument will define a plurality of different illumination and/or detection areas, and for easily determinable ranges of such distances, the illumination and detection distances will be at least partially superimposed.

13. Claims 44, 48 and 50 rejected under 35 U.S.C. § 103 as being unpatentable over Witte (US 4,054,391).

Those of ordinary skill in the art would have found it obvious and within their level of ordinary skill to select the particular illumination and detection areas and the shapes thereof.

Remarks

14. As set forth in the previous office action, claims 11-15, 17-19 and 22-25 appear to be allowable.

15. Claim 35, which sets forth placing the instrument at two different distances from the sample and using one for reflectance measurement apparently contains allowable subject matter; claim 35 is objected to as being dependent from an unallowed claim but would be allowable if rewritten in independent form including all of the limitations of its parent claim. It may be that claim 43 is intended to include this subject matter; see the rejection under 35 USC 112, first paragraph above. If claim 43 were amended to include this subject matter, claims 43-52 would be allowable.

16. As set forth above, in both Howarth and Borsboom the illumination areas and the detection areas are distinct. Notice also the distinct areas in Hirao et al.

17. It is noted that the rejections are of the claims, not of the disclosed invention. There is allowable subject matter disclosed, and at least some subject matter has been indicated as allowable.

18. Applicant's amendment necessitated the new grounds of rejection.

Accordingly, **THIS ACTION IS MADE FINAL.** See M.P.E.P.

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).


A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

19. Papers related to this application may be submitted to Group 2500 by facsimile transmission. Papers should be faxed to the Group 2500 PTO Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Group 2500 Fax Center numbers are (703) 305-3594 and (703) 308-1753.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to R. A. Rosenberger whose telephone number is (703) 308-4804.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.

R. A. Rosenberger
14 June 1994



RICHARD A. ROSENBERGER
EXAMINER
ART UNIT 255